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The Use of Language Functions in Mathematical Group Games

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Abstract

A variety of group games was introduced into a bilingual second grade class. The children's talk was recorded then classified using a modification of Dyson's language functions and strategies. Group games provided many communication opportunities. Some children even tried new communication styles.

Introduction

Board games, card games and a physical action game were introduced into M. Huerta's class to provide the bilingual second graders with the social, emotional, cognitive, and language benefits of group games. These group games met the educational criteria of providing a challenge, players judging their own success, and players participating actively throughout the game (Kamii & DeVries, 1980). Each game had a set of rules and a pre-established objective (i.e., racing to the end of the path, collecting the most objects, or getting the highest score). While group games have been introduced by constructivist math programs (Kamii & DeVries, 1985; Kamii & Joseph, 1989), we have not found games to be used extensively in bilingual classrooms.

The cognitive and social aspects of group games have been investigated (DeVries & Fernie, 1987, 1990; Kamii & Joseph, 1989), but language functions in mathematical group games were not found in the literature. The children's language usage was the most striking result of introducing group games into the classroom. To document the use of language in mathematical group games, Dyson's (1989) two-tier model of language with functions and strategies was modified. We found no language models developed around mathematical activities. Though Dyson's model was

developed around art activities, we found that the five functions provided adequate categories. The strategies were modified. Some strategies were not observed in the group games, and a few strategies derived from this data were added. Most functions include one nonverbal strategy. The functions and strategies are not mutually exclusive. Each function is described, and accompanying strategies include sample communications used from these video-taped group game sessions. (See Appendix)

When Dyson's model was adapted to the mathematical games experience, each player's behaviors were categorized by functions. Table 1 includes the range of language function frequencies identified in a video taped round of each game. Dinosaurs, Cow Bells, Football, and Chutes and Ladders were taped with four children players, while Sliders and Top Total were taped with two players.

From Table 1, we see the amount of peer language included in just one game playing session by the child with the highest language function frequencies and the child with the lowest frequencies. Group games provide communication opportunities to inform others, to direct others' behavior, to seek information, to share feelings, and to relate socially. In a traditional mathematics program of teacher instruction and individual pencil and paper work, few of these interactions would have occurred. Children in a traditional basal program listen to instruction then complete worksheets independently. Traditional programs do not provide the many opportunities to use language to discuss playing procedures, negotiate conflicts, argue about problem solving, listen to another's solution, or share feelings about fairness that group games provide.

The playing of group games also afforded some children new opportunities. In the classroom, Marisa was always observed being quiet and deferring to others. However in a round of Chutes and Ladders, she spoke endearingly yet assertively to Joaquin. "Ya te vas pá [sic] abajo! Andale, chiquito." (Now go down. Go little one.) Marisa also held her ground as Joaquin protested and pleaded with her. She explained herself and announced, "Ay, yo soy first." (Oh my! I go first.) Another child, Abram usually displayed an egocentric attitude. However during a game of Dinaosaurs, he made use of all the language functions and made less frequent use of directive language. Abram even took Natali's point of view into account to the extent that Natali made the observation: "Ya le vas a seguir la idea." (Now you get the idea.)

Table 1
Range of Language Function Frequencies Per Child

Game	Representational	Directive	Heuristic	Personal	Interactional
Dinosaurs	4-2	10-2	5-3	4-2	4-1
Cow Bells	3-1	3-3	4-1	1-0	1-0
Football	3-1	6-1	4-1	5-2	5-0
Chutes & Ladders	6-5	8-4	7-2	5-2	1-0
Sliders	2-0	6-4	5-3	1-0	1-0
Top Total	7-2	1-0	1-1	0-0	0-0
	High-Low	High-Low	High-Low	High-Low	High-Low

The process of observing language functions has transformed our awareness of the group games. We find an over-all richness and complexity in childrens' talk and discover surprises among students that are not displayed in traditional contexts. This awareness is the most important outcome of this study. We view this study as an initial step in becoming "in-the-field researchers" to expand our knowledge of children.

Combining the energetic conviviality inherent in the game event to promote language development with appropriate cognitive objectives is a winning combination which can be pursued in the classroom. This point was coincidentally expressed by Xico when he responded to a question about a game.

M. Huerta: ¿Cómo les gusta mejor, con las tarjetas o no más con papel y lápiz? (How do you like it better, with the cards or just with pencil and paper?)

Ofelio, Santos, and Xico in unison: Con las tarjetas. (With the cards.)

Xico: ¡Tiene mas emoción! (It has more feeling!)

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Appendix
Adaptation of Dyson's Model

1. Representational language was used "to give information about events and situations (real or imagined, past or present)" (Dyson, 1989, p. 284). Responding is the only strategy added to this function.

a. Associating or comparing with earlier experiences: "Enciérrala, como le hiciste hace rato, ¿verdad que sí?" (Block her, as you did it a while ago, right?)

b. Announcing an action or event which is akin to Dyson's strategies of reporting and narrating: "Gané, porque yo fui la primera que llegué". (I won because I was first to get there.)

c. Dramatizing or acting out actions: hypnotizing the dice, holding the dice in cupped hands while making circular motions, kissing and/or blowing at the dice.

d. Reasoning: counting in both directions before making a move in Cow Bells, thinking about a play in Chutes and Ladders: "No tienes que estar arriba para venirte para abajo." (You don't have to be above to go down.)

e. Responding to questions or actions: The adult asked, "How do you know that?" Natali said, "Because that was the bigger number."

2. Directive language was used "to direct the actions of self and/or others" (Dyson, 1989, p. 284). Instructing is the only strategy maintained from Dyson's model. The other three strategies came from the group games data.

a. Instructing or explaining: "Aquí se comienza." (This is the starting point.)

"Estamos saliendo en el seis. Tu estás en el 15." (We are going out on the six. You are at 15.)

b. Referring to rules: reading rules silently, chorally and/or individually. When a dispute erupts over Xico's location, the rest of the players read the game card simultaneously.

c. Suggesting: "Saca el verde, para que estén todos los colores." (Take out the green ones so that all the colors will be used.)

d. Verifying physically: Emanuel's slider is about 5 inches from the edge. Erica's is about 10 inches away. Whoever is closer to the edge gets the point. Erica and Emanuel proceed to measure and remeasure, then determine point assignment. Children also checked partners' distances.

3. Heuristic language is used to seek information, to explore alternatives or to learn about reality. Seeking consent is the only strategy added to Dyson's model.

a. Seeking confirmation: "¿Cuánto me tocó, Ofelio?" (What did I roll Ofelio?) "¿Aquí es siete?" (Is it seven here?) "¿Aquí es ocho?" (It is eight here?)

b. Seeking fact: "¿Dónde estabas?" (Where were you on the game board?)

c. Seeking to test: "¿Catorce, le quitas 3?" (Fourteen take away 3?) Nereyda checked Xico's calculation.

d. Seeking consent: "¿Te puedes esperar hasta que yo gane?" (Can you wait until I win?)

4. Personal language is used to express personal feelings, opinions, and individuality. Both accompanying strategies came from the group games data.

a. Verbal: "¡Yo soy el campeon del mundo!" (I'm the world's champion.) "¡Por favor Diosito, por favor!" (Please God, please!)

b. Nonverbal language: putting hands on head while lowering head toward the table after rolling a low number.

5. Interactional language is used "to initiate, maintain, and terminate social relationships" (Dyson, 1989, p. 286). No strategies were identified by Dyson. The strategies listed came from this group game data.

a. Admonishing: "No quieren entender." (You don't want to understand.) "La hubieras dejado." (You could have let her.)

b. Protesting: "¡Se te cayó uno!; pero ¿qué te pasa?" (You rolled a one; what's the matter with you?)

c. Courtesy: "Perdón, Fernando." (Pardon me, Fernando.)

d. Singing together: Individually and in groups children sang numbers in English and Spanish to known or invented tunes.

e. Teasing: Ofelio read the English penalty card to Eduardo, then said, "Estás enfermo. ¡Te lastimaste!" (You are sick. You are hurt!)

f. Nonverbal: Joaquin smiled sheepishly when he was caught cheating.